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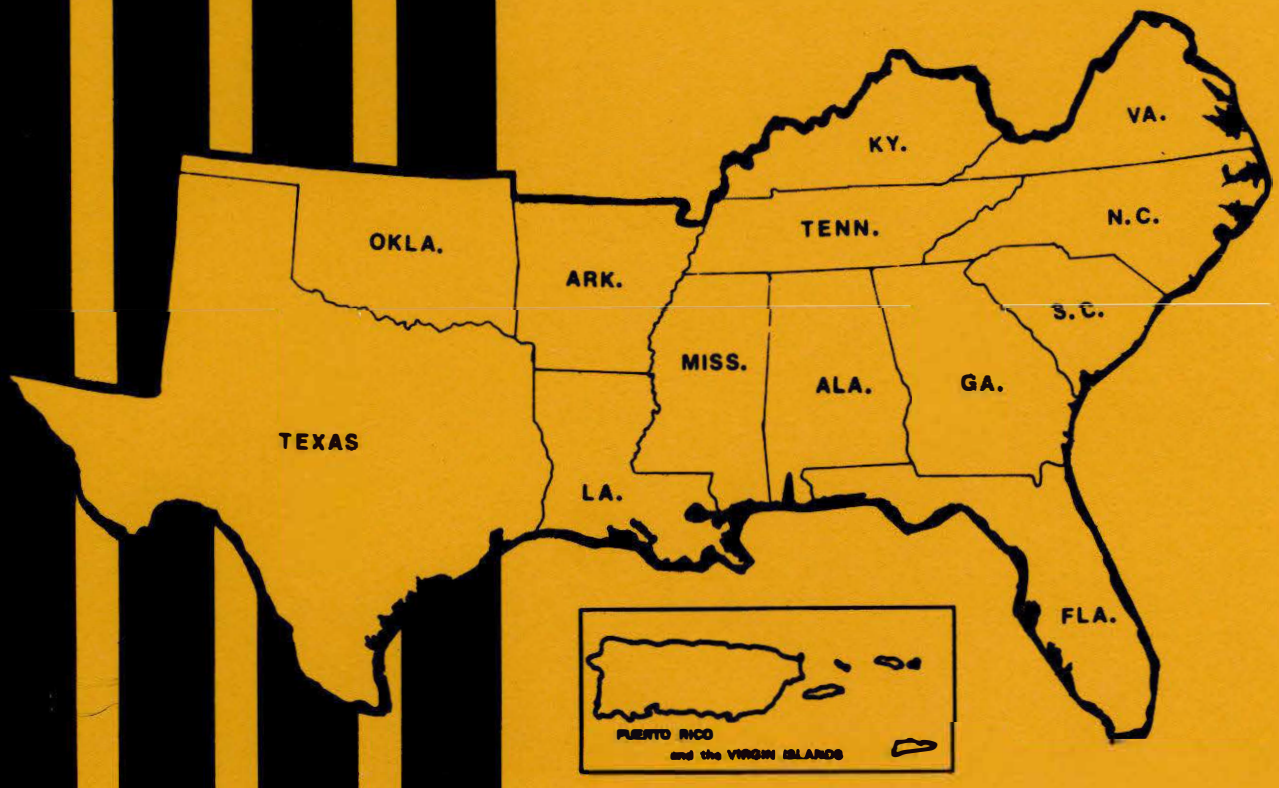
EVALUATION OF SOUTHERN PINE BEETLE INFESTATIONS ON THE CHICKAMAUGA AND CHATTANOOGA NATIONAL MILITARY PARK, GEORGIA



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# EVALUATION OF SOUTHERN PINE BEETLE INFESTATIONS ON THE CHICKAMAUGA AND CHATTANOOGA NATIONAL MILITARY PARK, GEORGIA

By

J. D. Ward

## INTRODUCTION

The Chickamauga and Chattanooga National Military Park is an important historical landmark commemorating Civil War action in the Chattanooga, Tenn., area. The Park is administered by the National Park Service, U. S. Department of Interior and is located south of Ft. Oglethorpe, Ga. (Figure 1).

During February 1975 the Georgia Forestry Commission informed the U. S. Forest Service that southern pine beetle infestations had been found on the Chickamauga and Chattanooga National Military Park. This bark beetle is the most destructive insect pest attacking pine in the South, and it has the potential for killing the entire pine resource on the Park.

The U. S. Forest Service, which has the responsibility for conducting forest pest evaluations on all federal lands, made an aerial and ground evaluation of the beetle outbreak on the Park on February 13, 1975. This report summarizes the results of that evaluation.

## TECHNICAL INFORMATION

Insect - Southern pine beetle, *Dendroctonus frontalis* Zimm.

Importance - This beetle is considered the most destructive insect enemy of pines in the southern United States and Mexico. Outbreaks may occur at irregular intervals every 10 to 20 years and generally last from 2 to 5 years.

Hosts - All species of southern yellow pine are attacked. However, loblolly, *Pinus taeda*, and shortleaf, *P. echinata*, pines are the preferred hosts. On the Chickamauga and Chattanooga National Military Park the beetle is attacking these pine species in addition to Virginia pine, *P. virginiana*.

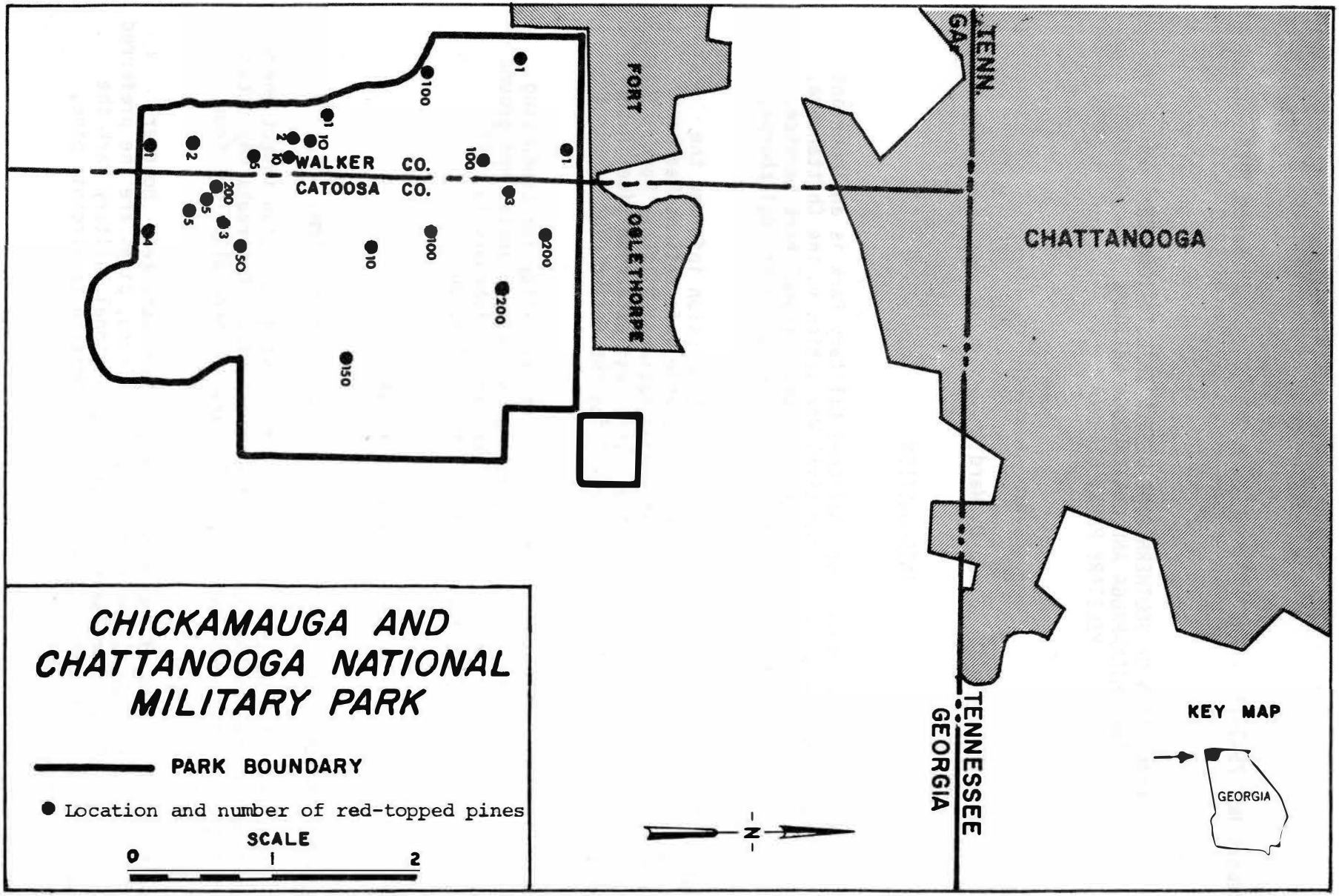


Figure 1. Location of southern pine beetle infestations detected on the aerial survey of the Chickamauga and Chattanooga National Military Park, February 1975.

Type of Damage - Attacks almost always result in the death of the trees. The adult beetles girdle the host by mining in the cambium layer while constructing egg galleries. Also, the adult beetles introduce blue staining fungi, *Ceratocystis* spp., which block water conduction in the stem. Individual infestations may range from one tree to several thousand trees.

Life Cycle - The adult southern pine beetle is a dark reddish brown beetle about 1/8-inch long. The beetles attack trees in masses and construct winding S-shaped egg galleries in the cambium (Figure 2). Eggs deposited along the galleries hatch into whitish, legless grubs (larval stage) that feed in the cambium. When fully developed, the larvae mine to the outer bark where they pupate and transform to adults. New adults chew their way to the outside and fly to green trees in the area.

The complete life cycle takes about a month during the summer and as many as four or five generations may be produced annually in this area.

Description of Pine Resource on the Park - From 30 to 50 percent of the forest on the 5,000-acre Park is comprised of pine species. Large overmature pines surround many of the battle sites and other historical points (Figure 3). These overmature pines are particularly susceptible to attack by the southern pine beetle. The Park also has many overstocked pine stands which are highly susceptible.

## RESULTS AND DISCUSSION

This evaluation revealed a severe southern pine beetle outbreak on the Chickamauga and Chattanooga National Military Park (Tables 1 and 2).

Table 1.—Summary of Aerial Survey Data[1/] for Evaluation of Southern Pine Beetle Infestations on the Chickamauga and Chattanooga National Military Park, February 1975.

| Infestation Size (Number of Red Topped Trees) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2-5 | | 6-20 | | 21-50 | | 50+ | | Total | |
| Singles | Spots | Trees | Spots | Trees | Spots | Trees | Spots | Trees | Spots | Trees |
| 13 | 12 | 52 | 3 | 23 | 0 | 0 | 6 | 810 | 34 | 898 |

1/ Corrected according to data by Aldrich et. al. (1958).

The aerial survey showed infestations occurring throughout most of the Park. Spots ranged in size from 1 to 200 trees (Figure 1). Approximately 1,500 trees in 34 infestations have been killed by the beetle during the last 12 months. An estimated 658 trees were actively infested at the time of the survey. This large number of infested trees indicates

Table 2. Summary of the results of southern pine beetle evaluation conducted on the Chickamauga and Chattanooga National Military Park, February 1975.

| | |
|---|---|
| 1. Results compiled from data collected during the aerial phase of the evaluation: | |
| Survey type | Aerial Sketchmap |
| Date of aerial survey | February 13, 1975 |
| Total acreage surveyed | 5,000 |
| Total acreage of susceptible host type | 2,000 |
| Total number of spots within the survey boundary | 34 |
| Spots per M acre of host type | 13.6 |
| Average spot size (trees) | 26 |
| Range of spot sizes (trees) | 1-200 |
| 2. Results compiled from data collected during the ground and aerial phases of the evaluation: | |
| Date of ground phase | February 13, 1975 |
| Infested trees per M acre of host type | 359 |
| Total number of infested trees within the survey boundary | 658 |
| Ratio of green infested to total red and fading trees | 1:7.5 |
| Brood density—insects per square foot of bark surface | 484 |
| Total number of recently killed trees | 1,518 |

a very high potential for an increasing beetle population during the coming summer and fall.

Individual trees sampled on the ground showed healthy brood and high brood densities (Figure 2). Parasites and predators of the beetle were found, but they are not expected to control the population in 1975.

## RECOMMENDATIONS

Unless infestations are removed from the Park, additional tree mortality will occur during the coming summer and fall. The decision regarding the need for suppression and methods of suppression to use should be made by the managers of the Park. Some of the factors which might be considered in making this decision include:

1. Impact of beetle damage to historical sites and scenic areas in the Park.

2. Threat of beetles spreading from the Park to adjoining private lands.

3. Availability of a suitable suppression method.

4. Cost/benefit ratio.

5. Impact of suppression measures to the environment.

6. Safety and fire hazard caused by the deteriorating beetle-killed trees.

Most of these factors are discussed in the Environmental Statement entitled Strategy for Control of the Southern Pine Beetle in the Southeastern United States.

There are currently three direct methods of suppressing southern pine beetles recommended by the U.S.D.A. Forest Service. The first method, which is also the most desirable, is to remove the infested trees. (Figure 3.) This can be accomplished by commercial sale of the infested trees or by hiring a contractor to remove the infestations. The other two methods are to pile and burn the infested trees or cut and spray the infested trees with a 1/2 percent solution of lindane. This chemical is approved by the U.S.D.A. for control of the southern pine beetle, but it is currently on the restricted use list of the National Park Service.

These methods will not guarantee that the pine stands will not be reattacked but they will stop the spread of individual infestations if done properly. Specific details for using any of these methods are available from the U. S. Forest Service, Forest Pest Management Office in Asheville, N. C.

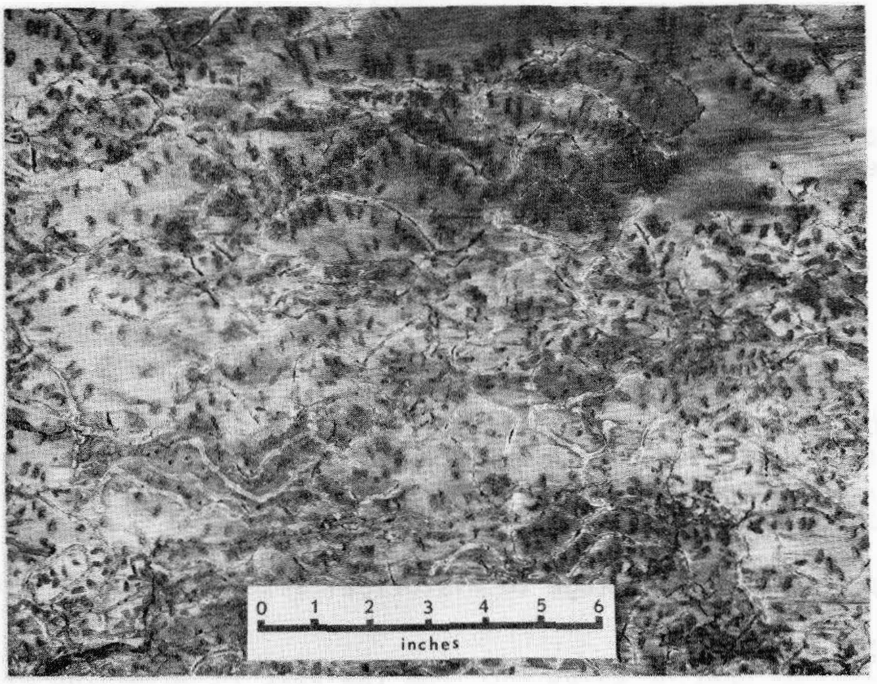


Figure 2. Bark samples taken from beetle infested trees on the Park showed heavy concentration of the S-shaped egg galleries and healthy brood production.

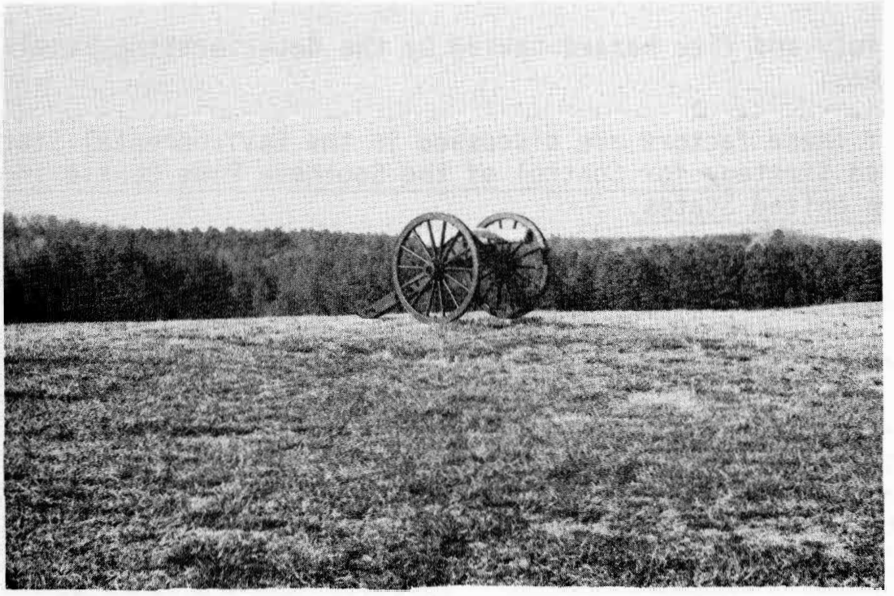

Figure 3. Southern yellow pines are a major component of the forest vegetation which surrounds the historical sites such as this battle field.

| FIELD OFFICES | FOR STATES OF |
|---|---|
| **Asheville Office**<br>John H. Thompson<br>Supervisor<br>U. S. Forest Service<br>Post Office Box 5895<br>Asheville, North Carolina 28803<br><br>Phone: (704) 258-2850, Ext. 625 | Florida<br>Georgia<br>Kentucky<br>North Carolina<br>South Carolina<br>Tennessee<br>Virginia |
| **Alexandria Office**<br>Donald A. Pierce<br>Supervisor<br>U. S. Forest Service<br>2500 Shreveport Highway<br>Pineville, Louisiana 71360<br><br>Phone: (318) 445-6511, Ext. 311 | Alabama<br>Arkansas<br>Louisiana<br>Mississippi<br>Oklahoma<br>Texas |

AREA OFFICE

Frank M. Yasinski
Group Leader
Forest Pest Management
U. S. Forest Service
1720 Peachtree St., N.W., Room 711
Atlanta, Georgia 30309

Phone: (404) 526-4986

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